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Health Benefits and Therapeutic Potential of Yogurt-Derived Lactobacilli: A Review of Probiotic Mechanisms and Safety Profiles

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Abstract

Dairy products are considered nature's most perfect food for men. The fact that dairy products have many health benefits and are associated with the existence of valuable bacteria is securing scientific credibility at a precipitous pace. Numerous health advantages have been ascribed to meals containing living microorganisms, most notably *Lactobacillus* species. *Lactobacillus* species can be isolated from yogurt, which has been a popular milk-based commodity in the world since the dawn of time. Probiotic Lactobacilli are gaining utmost importance not only because of their nutritional value but also due to their therapeutic potential towards multifarious diseases such as gastrointestinal infections, antibiotic-associated diarrhea and respiratory and genitourinary infections. Additionally, adequate probiotic use may help suppress lactose intolerance, cardiovascular diseases, *Helicobacter pylori* infection and Crohn's disease, as well as ameliorate inflammatory bowel illness and prevent cancer. Despite being well popularized, there are conflicting clinical results of using probiotic Lactobacilli strains so ensuring the safety of probiotics for people is very crucial. This review article discusses the general features and characterization of Lactobacilli found in yogurt and the possible therapeutic applications, mechanism of action and adverse effects.

Introduction

The concept of using food as medicine dates back thousands of years to Hippocrates, the Greek philosopher and founder of medicine, who famously stated, "Let food be thy medicine, and let medicine be thy food." This ancient wisdom has seen a resurgence in recent times with the rise offunctional foods: foods that offer health benefits beyond basic nutrition. Central to this revival is the gut, which acts as a gateway between the diet and the body's other systems, making it a primetarget for the development of functional foods [1]. Consequently, there has been a significant increase in the recognition and cataloging of the health benefits provided by these functional foods. The utilization of lactic acid-producing bacteria (LAB) and fermented foods have been linked to several health advantages, including modulation of the immune system, augmentation of resistance against cancer and the prevention of infectious diseases [1]. Bacteria involved in the production of lactic acid have had significant impacts on the establishment and traditions of human civilization throughout history. Lactic acid bacteria are found in several settings and are extensively spread in nature. They are very bio-diverse, are intimately linked to human production and existence, and have substantial social and economic significance [2]. Lactic acid bacteria (LAB) are often employed in the manufacturing of probiotic fermentedfoods and are usually regarded as preparations that contain antibiotic tolerance as well as organisms that are generally regarded as safe (GRAS) and can be utilized safely in medicinal and veterinary applications [3]. Furthermore, the lactic acid generated by lactic acid bacteria aids in the creation of texture, fragrance and taste in many milk products. Several lactic acid bacteria strains have been suggested and utilized as probiotic strains such as *Pediococcus, Streptococcus, Leuconostoc, Lactosphaera, Carnobacterium, Lactobacillus, Vagococcus, Weissella, and Oenococcus*. These are among the 11 genera of lactic acid bacteria connected to food. *Lactobacillus* species are the most abundant probiotic bacteria and play an important role in maintaining the intestinal microflora and boosting the human immune system [4]. *Lactobacilli* are gram-positive, non-spore-forming and non-flagellatedrods or coccobacilli in general. *Lactobacilli* originates from an array of habitats that possess carbohydrate abundance. Such habitats include animal and human mucosal membranes (intestine, vagina, and oral cavity), manure, anthropogenic habitats such as sewage and spoiling or fermenting food and plant-derived matters [5]. These *Lactobacillus* bacteria are vital in protecting the organism from infectious germs and suppressing pathogenic bacteria in the intestine and urinary tract. Additionally, anti-inflammatory and anticancer capabilities are consequential of the therapeutic qualities of several *Lactobacillus* strains [6]. *Lactobacilli* are mostly found in dairy products and can therefore be isolated from fermented milk products such as acidophilus milk and yogurt. People in Pakistan use many kindsof milk and milk-related products as a source of animal protein. Among these milk products, yogurt is the most extensively consumed. Common species of *Lactobacillus* found in yogurt include *L. acidophilus, L. casei,* and *L. bulgaricus* [7]. Yogurt *Lactobacilli* has probiotic properties. Probiotics are active components of microorganisms that have a favorable influence on the health of the host. By aiding the absorption of magnesium and calcium from milk proteins, digesting lactose, and generating folate and vitamin B, probiotics have a substantial impact on the bioavailability of nutrients in the human body [8]. The passage of probiotic bacterial strains present in yogurt occurs through oral consumption. Therefore, as they travel from the mouth to the lumen of the lower intestine, they must withstand harsh chemical and physical conditions. These stressors in the gastrointestinal tract (GIT) include low pH acidity and bile. Consequently, the survival of these strains contributes to their beneficial effects [9]. The primary aim of this review is to evaluate the general characteristics of *Lactobacillus* species found in yogurt, the significance of their biochemical and physiological traits, and to provide insight into their probioticproperties and their beneficial applications (Fig. 1).

General Characteristics of *Lactobacillus* Species

Lactobacilli are one of many types of beneficial bacteria that live in the human genital, urinary, and digestive systems without causing any damage or illness. These species are mostly found in foods produced through the process of fermentation, such as yogurt, cheese, and pickles [10]. With around 170 species, the *Lactobacillus* genus is taxonomically classified as a member of the family Lactobacillaceae, the order Lactobacillales, the class Bacilli and the phylum Firmicutes [11]. Typically, they are coccobacilli or rods with a DNA composition of less than 50% GC content. These bacteria are

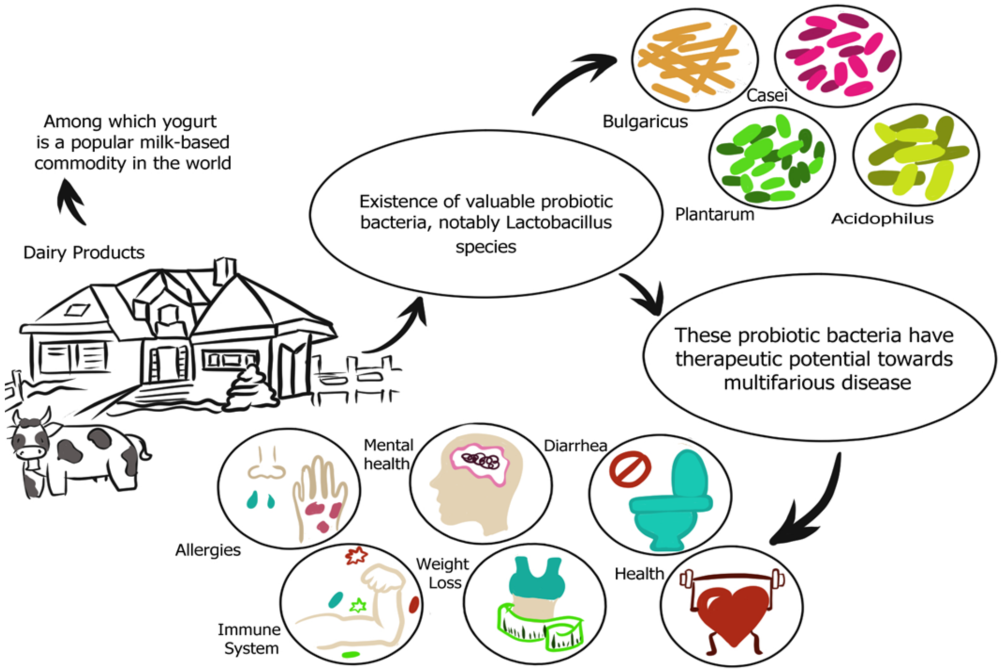


Fig. 1 Existence and therapeutic potential of milk-based probiotics.

Gram-positive, non-spore-forming, and non-motile. *Lactobacilli* has very complex nutritional requirements, such as vitamins, nucleic acid derivatives, salts, fatty acid esters, peptides, amino acids, and carbohydrates. They are either acidophilic or aciduric, anaerobic or aerotolerant, and obligate fermenters. *Lactobacilli* can either be homofermentative, where glucose is primarily fermented to lactic acid, or heterofermentative, where glucose is fermented to equimolar quantities of lactic acid, CO_2 and ethanol (and/or aceticacid) [12]. They lack heme-dependent activities due to their inability to synthesize porphyrinoids. Certain strains of *Lactobacilli* exhibit catalytic activities such as cytochromes and nitrite reduction using externally sourced porphyrinoids [5]. *Lactobacilli* can grow on blood agar, and some species may require selective media for optimal growth. Under the microscope, these bacteria appear non-motile, with rod lengths varyingfrom long to short. They typically grow in chains and have a curved morphology like coryneformbacteria. The primary metabolic product of glucose fermentation is lactic acid, although trace amounts of succinic and acetic acids can also be produced [13]. *Lactobacilli* thrive in environments rich in carbohydrate-containing compounds, and thus are found in diverse habitats such as plant or plant-derived materials, animal mucosal membranes like the vagina, gut, or oral cavity, and in manure [5].

Characterization of *Lactobacillus* Species

The *Lactobacilli* colonies that grow on MRS (De Man, Rogosa, and Sharpe agar) media are initially morphologically examined. *Lactobacilli* colonies on MRS media typically appear white and mucoid, as depicted in Fig. 2A [14]. These colonies are then picked and Gram-stained; *Lactobacillus* species appear gram-positive and rod-shaped under the microscope, as shown in Fig. 2B and 2C. Motility testing is conducted using the hanging-drop method to assess bacterial movement. *Lactobacilli*, being non-motile, shows negative results for this test [15].

Physiological Characterization

The next step involves determining the physiological characteristics of the strains. This includes testing their growth at different temperatures, pH levels, and bile concentrations, as well as their tolerance to phenol and salt concentrations. Probiotic bacteria like Lactobacilli need to withstand acidity, salt, and bile to survive in the human gastrointestinal tract (GIT) [16]. Many researchers have isolated various strains from yogurt and fermented foods to assess the pH and bile salt concentrations at which Lactobacilli can thrive and optimal ranges of pH, temperature, phenol concentration, bile salt concentration and NaCl concentration are detailed in Table 1.

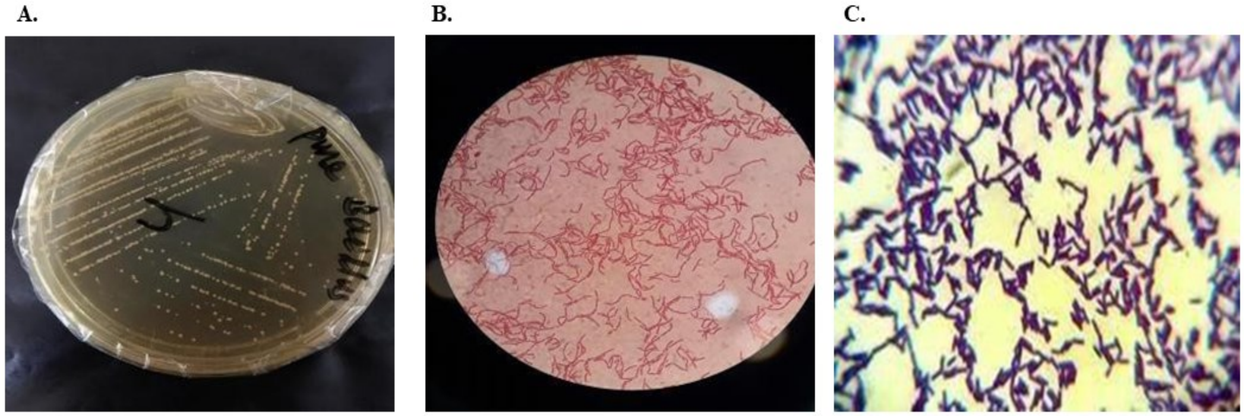


Fig. 2 Lactobacilli colonies. (A) Lactobacilli colonies on MRS media, (B and C) Gram-stained, Gram-positive, rod-shaped Lactobacilli.

Biochemical Characterization

There are a multitude of biochemical tests for the characterization of *Lactobacilli*, some of which include Arginine hydrolysis, Fermentative test, Catalase production, Aesculin Hydrolysis, and Casein digestion tests.

Catalase production

Catalase is an extracellular enzyme released by a variety of bacteria that aids in the breakdown of hydrogen peroxide generated during the consumption of carbohydrates for energy generation, making its existence or absence in a microbial cell a useful tool for diagnosis. Catalase is engaged in accelerating the disintegration of hydrogen peroxide which pertains to being toxic. This results in the formation of molecular oxygen and the generation of effervescence. In this test, the culture of microbes is combined with an equivalent amount of 3% hydrogen peroxide solution. The production of effervescence signifies a positive result, and no effervescence signifies a negative result. The *Lactobacillus* genus lacks the catalase enzyme, so they tend to produce no gas (no effervescence); hence, it can be concluded that Lactobacilli are catalase-negative [7, 15, 19, 20].

Table 1 Optimum ranges for pH, temperature, phenol concentration, bile salt concentration, and NaCl concentration for the genus *Lactobacillus*.

Physiological conditions	Optimum range	Reference
Temperature	30°C-42 °C	[7, 17]
pH	5.5-6.2	[17, 18]
NaCl	2-4%	[6, 7, 14,16]
Phenol	0.1%-0.4%	[6, 14,16]
Bile salt	0.3%-0.5%	[16]

Arginine hydrolysis

Arginine hydrolysis is a biochemical process used to determine if a strain can produce ammonia from arginine [16]. Some strains of Lactobacilli can hydrolyze arginine and produce ammonia, while others cannot, as shown in Table 2.

Aesculin hydrolysis

Microbes such as Lactobacilli can break the esculin molecule and utilize the released glucose to meet their energy requirements, releasing the esculetin into the media (Table 3). This esculetin in the mediacombines with ferric citrate to generate a phenolic iron complex, which turns the dark brown mediablack, indicating a positive test [7].

Casein digestion test

Casein Digestion Test *Lactobacillus* species release protease enzymes and utilize casein in milk to maintain their growth rate in milk. All *Lactobacillus* species can digest casein. This property of *Lactobacilli* is particularly beneficial for lactose-intolerant people who are unable to produce β-galactosidase. Hence, fermented products such as yogurt can help lactose-intolerant people ingest lactose-containing foods **[**22].

Fermentative tests

Lactobacilli are tested for their capacity to ferment different sugars using sugar fermentation tests (Table 4). Different isolates tend to show different types of sugar utilization patterns. Sixteen sugar fermentation results of different *Lactobacilli* have been documented here [16].

Table 2 Detailed results of the arginine hydrolysis reaction for some *Lactobacillus* species.

Organism	Ammonia production	References
L. acidophilus	—	[3]
L. Plantarum	+	[3,16,21]
L. casei	—	[3,16]
L. brevis	+	[3]
L. rhamnosus	—	[17,21]
L. fermentum	+	[17,21]
L. helveticus	—	[3]
L. delbrueckii	Variable	[3]

Table 3 Aesculin hydrolysis reaction for some *Lactobacillus* species.

Organism	Aesculin Hydrolysis	Reference
L. acidophilus	+	[3]
L. Plantarum	+	[3]
L. casei	-	[3]
L. brevis	-	[3]

Lactobacillus Species in Yogurt

Yogurt is the most frequently used milk-based product in Pakistan. Probiotic yogurts such as *Bifidobacterium bifidum*, *L. casei*, and *L. rhamnosus* (LGG), are now commercially accessible and contain a wide range of *Lactobacillus* species, the presence of which has been confirmed by several experts throughout the years [25]. The major *Lactobacilli* species in yogurt are *L. acidophilus, L. brevis, L. fermentum, L. rhamnosus, L. Casei. L. Pentosus, Lactobacillus Paracasei, L. Helveticus, L. Delbrueckii* and *L. plantarum* (Table 5).

Probiotic Properties of Lactobacilli

Probiotics are described as "live microorganisms that, when administered in adequate amounts, confer a health benefit on the host." Several species of microbes are envisioned as probiotics: the key Lactobacillus probiotic strains that may be present in yogurt include *L. casei, L.rhamnosus, L. plantarum, L. acidophilus, L. paracasei, L. reuteri, L. helveticus, L. delbrueckii,* and *L. fermentum* [36]. The most popular tribal strains of *Lactobacilli* are employed in numerous probiotic-containing dairy products such as cheese, yogurt,and curd [9]. Due to their inherent resistance to bile, acid, and inhibitory enzymes such as pepsin and pepsinogen, Lactobacillus species are the most common and have demonstrated compatibility with the human gastrointestinal system [4]. The properties that recognize *Lactobacilli* as probiotics include their safety for human use, as they are non-pathogenic and non-toxic. They can survive and resist gastric juices and bile toxicity. Additionally, they efficiently adhere to and colonize the gastrointestinal and urinary tracts, and they remain stable and viable for extended periods during storage and food fermentation [37, 35].

Resistance to acid and bile salts

If a probiotic is delivered through the oral route, it should have the ability to tolerate high acid and bile salt because the gastrointestinal environment of humans or animals is very stressful due to the elevated concentration of acid and bile salts. The stress in the human gastrointestinal tract begins in the stomach. Depending on the individual, nutrition and other factors, stomach transit time can range from less than 1 hr to 4 hs. The pH in the stomach might drop to 1.5 and bile concentration in the upper intestinal tract might be varied and unpredictable at any given time [38]. Tolerance to GI stress is important not only for survival but also for better and easy colonization of the gastrointestinal tract, thus acid and bile tolerance is an absolute requirement for *Lactobacillus* species to function as a probiotic. Lactobacilli were found bile and acid-tolerant [22]; out of eight, four of the isolates were *Lactobacillus* and these isolates carried the capability of survival in 0.05%, 0.1%, 0.15% and 0.3% bile salt concentration and were also able to resist low PH.

Table 4 Fermentation results of fifteen sugars for different Lactobacilli species.

Species	Ar	Cel	Fru	Gal	Lac	Mni	Man	Mel	MaI	Raf	Rha	Sal	Sor	Suc	Xyl	References
L. fermentum	*v*	*v*	+	+	+	+	+	-	+	+	-	-	-	+	*nd*	[9,7,16,20]
L. rhamnosus	-	-	+	+	+	+	+	+	-	+	+	+	-	+	+	[21,7,20]
L. Plantarum	*v*	+	+	+	+	+	+	+	+	+	-	+	+	+	*nd*	[3,7,16,20]
L. acidophilus	-	+	+	+	+	-	+	+	+	+	+	+	-	+	+	[3,13,22,7]
L. helveticus	-	-	+	+	+	*nd*	-	*nd*	-	-	-	-	-	+	-	[7]
L. casei	-	+	+	+	+	+	+	+	-	-	-	+	-	+	-	[3,9,7,16]
L. brevis	+	+	+	+	+	+	-	+	+	+	-	*nd*	+	+	+	[24,23]

Ar= D-arabinose; Cel= α-Cellulose; Fru= Fructose; Gal= Galactose; Lac = Lactose; Sor= Sorbitol; Mal= Maltose; Mni= Mannitol; Man= Mannose; Mel=Melibiose; Ref=Raffinose; Rha=Rhamnose; Sal=Salicin; Suc=Sucrose; Xyl=Xylose
nd = not detected

Bile salt hydrolase activity

Bile salts are cholesterol-based bile acids that are synthesized in the liver. They normallytend to exist in conjugation with either glycine or taurine. These cholesterol-based bile acids accumulate and concentrate in the gall bladder before being discharged into the small intestine through the bile vessel. In the intestinal system, they function as enhancers of dietary fatabsorption. Pathogenic Gram-positive and Gram-negative bacteria (for instance *Escherichia coli*, *Enterococcus* genera and *Klebsiella* spp. try to colonize the intestines. These conjugated bile salts produce an inhibitory effect on the growth of these pathogens. Some bacterial probiotic strains can produce BSH, "Bile Salt Hydrolase," and, as a result, they can hydrolyze bile salts. This ability seems to appear as a defensive mechanism of the microbial strains against conjugatedbile salts and is linked to the strains' resistance to the presence of bile salt. Bile salts that have been deconjugated have decreased permeability and detergent action and may be less fatal to microbial strains. Glycine- and taurine-conjugated bile salts can be hydrolyzed by BSH to produce amino acids and free deconjugated bile acids. For instance, *Lactobacillus salivarius* possesses this characteristic [38].

Adherence to mucus and/or epithelial cells

One significant element for probiotic strain colonization is their capacity to adhere to intestinal epithelial cells; in fact, it is often regarded as a major requirement for colonization (Fig. 3). Probiotics can influence the microbiota of the gut, even though their colonization in the host's intestine isnot permanent; rather, they are there merely for a short period. Because probiotic strain adherence is an important feature in their colonization, it can be linked to variations in the gut microbiota. The adhering property may be very significant for the treatment of rotavirus diarrhea and may also be significant for immune system activation [39]. This phenomenon can be observed in several *Lactobacillus* species such as *L. rhamnosus* [39]. Leite et al. [40] highlighted the adherence property of *L. fermentum* HG3 and *L. gasseri* HG8 to intestinal epithelial cells of poultry chicken. The influence of bile salt on the surface morphology of *L. rhamnosus* was investigated, and it was discovered that the smoothness of the bacterial surface altered as the concentration of bile salt increased [39]. Recent evidence highlights that administration of *Lactobacillus* probiotic strains can exert protective effects not only in their traditional field of application, *i.e.*, the gut, but also in distantbody areas such as the respiratory tract, reducing the incidence of pulmonary infections and improving respiratory symptom [41]. Adhesion properties of various *Lactobacillus* strains to lung epithelial cells were investigated, revealing *L. acidophilus* as particularly adhesive. *L.acidophilus* also demonstrated the ability to inhibit *P. aeruginosa* adherence to lung epithelial cells, likely through an exclusion effect, and to reduce the release of pro-inflammatory cytokines from human PBMCs stimulated with *P. aeruginosa*. Interestingly, there was no significant difference observed between live and dead *L. acidophilus* in achieving these effects, suggesting promising potential for probiotic therapeutic interventions in vulnerable subjects.

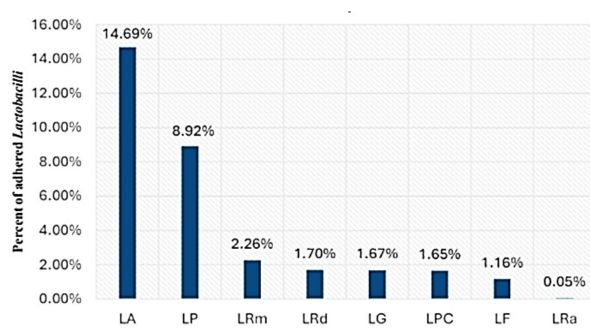
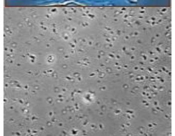
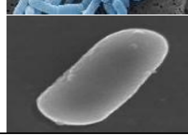


Fig. 3 Adhesion abilities of different *Lactobacillus* strains to the lung epithelial cell line A549 at a bacteria-to-cell ratio of 10:1. The percentage of adhered bacteria compared to the inoculum was assessed, with mean values ± SEM from four independent experiments are shown.
L. acidophilus (LA), *L. plantarum* (LP), *L. rhamnosus* (Microbiosys, LRm; Dicoflor, LRd; ATCC, LRa), *L. gasseri* (LG), *L. paracasei* (LPC), *L. fermentum* (LF).

Antimicrobial activity against pathogens

Another crucial factor to consider when choosing potential probiotic strains is their antimicrobial activity against infections. The antimicrobial compounds produced by LAB depend on the LAB species and the chemical makeup of the growth conditions provided. Homofermentative LAB ferment hexose to produce lactic acid, while heterofermentative LAB ferment the same substrate to yield equimolar quantities of acetate/ethanol, In the case of *Lactobacilli*, they tend to produce acetic acid, lactic acid, benzoic acid, and hydrogenperoxide [42]. Three bacteria, *Staphylococcus aureus, Salmonella typhi,* and *Escherichia coli* are infrequently detected as food-borne pathogens causing gastroenteritis. The results showed that selected Lactobacilli strains including *L. casei, L. brevis, L. acidophilus*, and *L. plantarum* exhibited inhibitory effects against these

Table 5 Major species of Lactobacilli found in yogurt.

Source	Micrograph	Morphology	Species	Other Sources	References
Yogurt		Gram positive, fermentative, spiral or straight rod or coccobacillary form.	*Lactobacillus acidophilus*	Ice cream, lassi, curd, soymilk, tomato orange juice	[26, 27]
Yogurt		Gram-positive bacteria that are not sporulating, rod or coccus form and motile.	*Lactobacillus brevis*	Sourdough, Idle and Dosa	[28, 29]
Yogurt		Non-motile, Gram-positive rod shape, mesophilic	*Lactobacillus casei*	Lassi, soymilk and curd	[30, 31]
Yogurt		Gram-positive, rod-shaped bacteria, non-motile and no spores	*Lactobacillus delbrueckii*	Ice cream and cheeses	[32, 33]
Yogurt		Rod shaped, non- spore forming, non- motile, Gram positive	*Lactobacillus fermentum*	Sourdough, Idli and Dosa	[34, 35]
Yogurt		Lactic acid producing, rod-shaped bacterium, Gram positive	*Lactobacillus helveticus*	Cheeses	[32, 35]
Yogurt		Rod-shaped, gram- positive bacteria thatdoes not produce spores	*Lactobacillus paracasei*	Tomato, orange, and grape juice	[8]
Yogurt		Gram-positive, rod-shaped, and spore-free.	*Lactobacillus pentosus*	Fermented olives	[28]

pathogenic bacteria. Sharma et al. [18] found that their isolate *L. plantarum*had strong inhibitory effects on *S. aureus* and *Escherichia coli. L. acidophilus* KS400 also demonstrated antimicrobial properties [43]. *Lactobacilli* dominate the healthy vaginal microbiota and are considered gatekeepers of this ecosystem, maintaining a healthy state andimpeding the growth of pathogens.

Antioxidant activity

Another significant and commonly used criterion for selecting probiotic strains is antioxidant activity. This antioxidant property is a valuable functional feature for a potential probiotic strain because a vast range of oxygen species and free radicals are generated in mammalian bodies and food systems. Reactive oxygen species, free radicals, and hazardous compounds present in the mammalian body can initiate a free radical chain reaction by destroying biological molecules, thereby causing harm to living beings. These oxygen species and free radicals are key triggers of various degenerative diseases, such as cardiovascular diseases, arterial plaque formation, cancer, bowel diseases, and memory loss in old age, arthritis, and skin aging. The mechanism of antioxidant activity of potential probiotic strains like *Lactobacilli* is still unclear, but it has been hypothesizedthat these strains can strengthen the host's cellular defense, reduce reactive oxygen species, enhance the incidence of superoxide dismutase, and minimize lipid peroxidation [38].Recent research has explored the potential of applying certain probiotics as natural antioxidants, with several LAB strains being validated for their antioxidant properties. Antioxidants, as chemical compounds, can prevent, halt, or reduce oxidative damage, making them widely

applicable in the food and pharmaceutical industries [44].

Cytotoxic effects

In terms of cytotoxic effects, probiotics are known to inhibit the expansion of various cancer cell lines. Furthermore, probiotics have shown a decrease in cancer formation in carcinogenic animal models, particularly in colon cancer [45]. Although the pathways of probiotics' anticancer activity are not completely clear, the associated mechanisms may include the generation of anticarcinogenic metabolites such as SCFAs (short-chain fatty acids), enhancement of the hostimmune response (particularly through the control of the expression of pro-inflammatory cytokine genes), and regulation of apoptosis and reduction of carcinogens either directly (by binding or absorbing carcinogens) or indirectly (through other mechanisms) [38].

Mechanism of Action of Probiotic Lactobacilli

A frequent misconception regarding how probiotics function is that their consumption enhances the "balance" of the intestinal and vaginal microbiota so that the proliferation of pathogens is controlled. The latest research suggests that this assumption is oversimplified, and that probiotic microflora can function in several ways [46]. *Lactobacillus* bacteria influence the immune system in the gut. These bacteria, either as whole cells or through their components, interact with membrane receptors like TLR-6 and TLR-2 found on macrophages and dendritic cells. This interaction stimulates the differentiation of various T cell subsets such as Th1, Th2, Th17, and Treg, which are key regulators of inflammation. Additionally, Lactobacillus species modify the intracellular pathways of immune cells, like macrophages, by affecting MAP kinases. These kinases can either activate or suppress transcription factors such as STAT and NF-kB, leading to increased release of anti-inflammatory cytokines [47].

Adverse Effects of Lactobacilli

Lactobacilli are an important component of human flora, but in some situations, they can be pathogenic. Bacteremia, infective endocarditis and abscesses are the most prevalent illnesses produced by Lactobacilli. Immunocompromised individuals or those with underlying anatomical abnormalities are more likely to get these illnesses. *Lactobacillus* spp. infections have been reported in individuals with AIDS or neutropenia, as well as those who have had organ transplants. Endocarditis, bacteremia, newborn meningitis, dental caries, abscesses, and chorioamnionitis are some of the more prevalent clinical illnesses produced by Lactobacilli. More study is required to enhance our fundamental knowledge of the circumstances in which Lactobacilli produce toxicity, particularly considering the rising popularity of *Lactobacillus* spp. products as "natural forms" of disease treatment [37].

Conclusions

This review highlights the general features, characterization and therapeutic applications of Lactobacilli found in yogurt, Food with medical potential has recently been revived as “functional foods" the gut is an attractive target for functional food development because it acts as a gateway between the diet and the rest of the body's systems. Lactobacilli are the most prevalent probiotic strain and are found in several probiotic dairy products. The major Lactobacillus probiotics that may be present in yogurt include *L.* acidophilus, *L. brevis*, *L. fermentum*, *L. rhamnosus*, *L. casei*. *L. pentosus*, *L. paracasei*, *L. helveticus*, *L. delbrueckii* and *L. plantarum*. Probiotics such as Lactobacilli confer many health benefits to humans and animals if administered in proper amounts. Among these benefits are the prevention of gastrointestinal infections and diarrhea, the lowering of serum cholesterol and genitourinary infections. Additionally, adequate probiotic use may help suppress lactose intolerance, Helicobacter pylori infection and Crohn's disease, as well as ameliorate inflammatory bowel illness and prevent cancer. Although probiotics are often recommended for usage, despite their widespread popularity and widespread perception of safety, there is a dearth of facts to support such widespread usage. Nevertheless, probiotics such as Lactobacilli tend to exhibit latent potential, motivating scientists to develop new technologies and continue their hunt for innovative therapeutic uses for probiotics.

Conflict of Interest

The authors have no conflicts of interest.

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